

Status SSR I Cavities

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for the group of testers:

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Cavity Processing prior Vertical Test

Allan Rowe

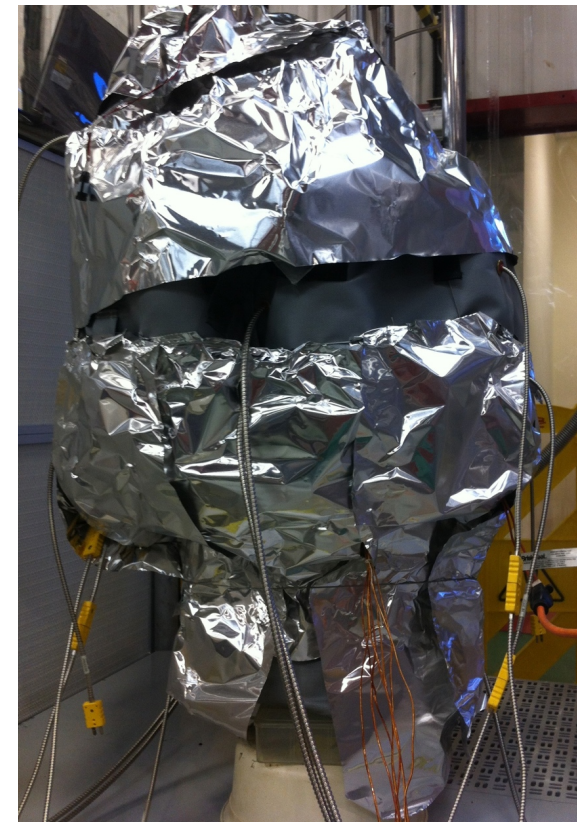
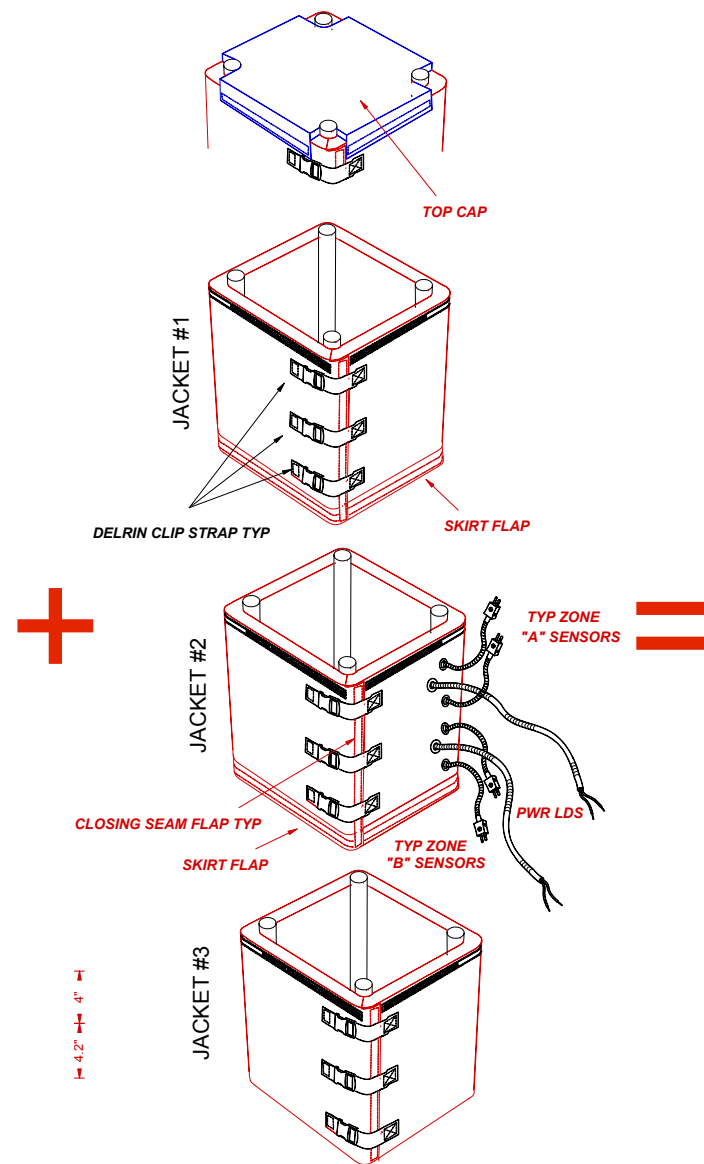
- I. Incoming QC/QA
 - a. Visual inspection
 - b. CMM
 - c. RF QC
 - d. Vacuum leak check
2. US degreasing/UPW rinse
3. Bulk BCP (60+60 um)
4. US degreasing/UPW rinse
5. HPR in B101 to prepare for H₂ degassing
6. 600C bake 10h plateau in MP9 oven
7. RF tuning
8. US degreasing/UPW rinse
9. Light BCP (20-30 um)
10. HPR in G150 (horizontal)
11. HPR in B101 (vertical)
12. Cleanroom assembly
13. Evacuation/leak check (10^{-10} mbar-l/s or better)
14. 120C vacuum bake in IBI or MP9 120C ovens (24h hold minimum)

- 4 weeks to process one cavity
 - ▶ Few cavities can be processed in pipeline
- Finalizing 120C oven commissioning in MP9
- Need few more sets of hardware for cavity preparation/assembly for VTS
- Work is ongoing on improvement of tooling at ANL

Cavity Processing prior Vertical Test

Allan Rowe

- 120C bake is beneficial for removing water from the cavity surface
 - ▶ Shortens multipactoring processing time during cold test
 - ▶ Possible reduction of Q_0 by 30-40%?
 - would like to try lower temperature bake for one of the next cavities
- Improvised 120C bake in IBI using blankets and Al foil



Cavity Processing prior Vertical Test

Allan Rowe

- 120C oven in MP9 - our (very) near bright future for pre-VTS 120C cavity baking



Summary of Vertical Tests

- Tested 2 SSR I cavities this year: SIH-NR-105, SIH-NR-107
 - ▶ 4 cold tests total
 - 3 tests of SIH-NR-105 and 1 test of SIH-NR-107
 - ▶ Each test takes one week
- 3d cold test of SIH-NR-105 (June 23 - June 27)
 - ▶ soft multipactor at 2-6.5 MV/m, processed at 4.5K, no multipactor at 2K
 - ▶ maximum gradient quench limited at 19.5 MV/m; $Q_0 \sim 3.5e9$; X-ray $\sim 2e-2$ mR/h
 - ▶ FE onset at 18 MV/m
- 1st cold test of SIH-NR-107 (July 27 - July 31)
 - ▶ multipactor at 2-7 MV/m, processed at 4K, some multipactor at 4-7 MV/m present at 2K
 - ▶ maximum gradient quench limited at 22 MV/m; $Q_0 \sim 2.3e9$; X-ray ~ 0.4 mR/h
 - ▶ FE onset at 16 MV/m

Both cavities passed Project X requirements: $E_{acc}=12$ MV/m, $Q_0>5e9$

SIH-NR-107 in Preparation for Vertical Test

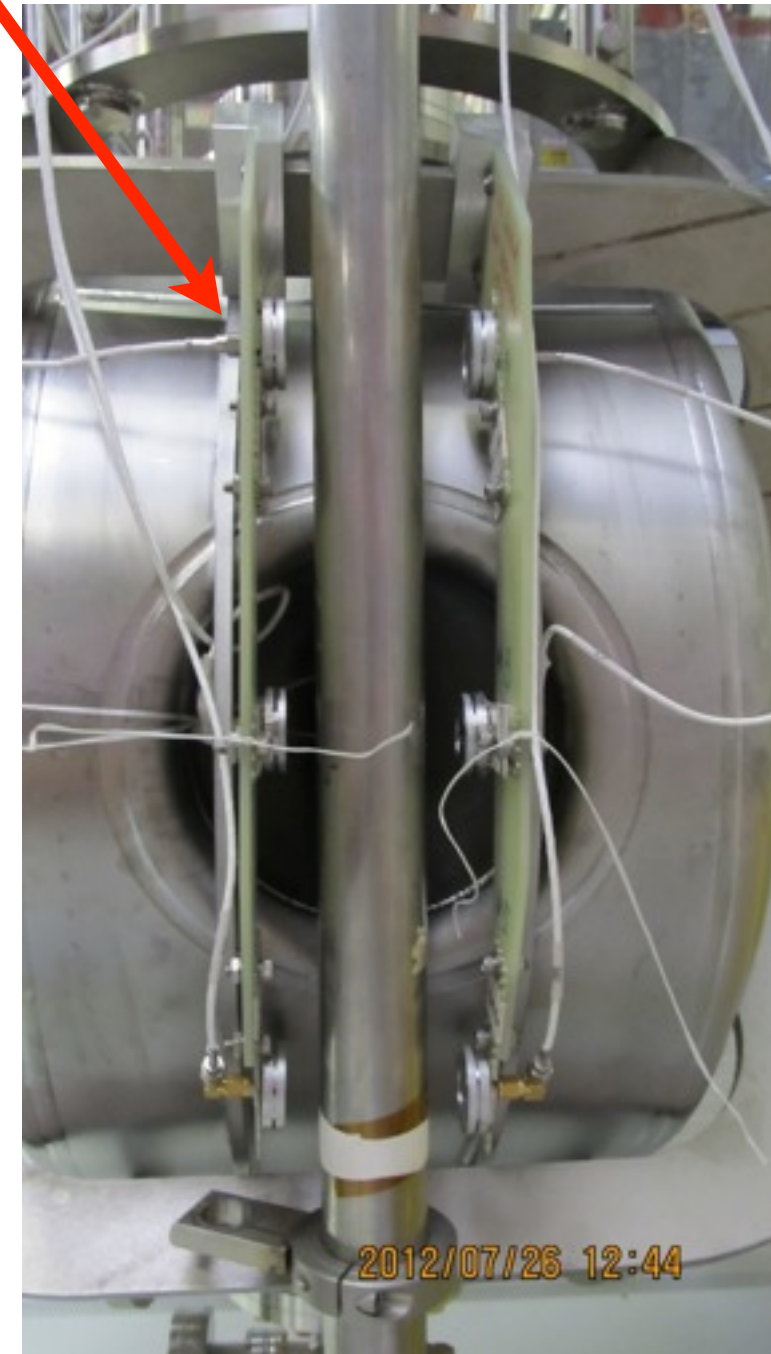
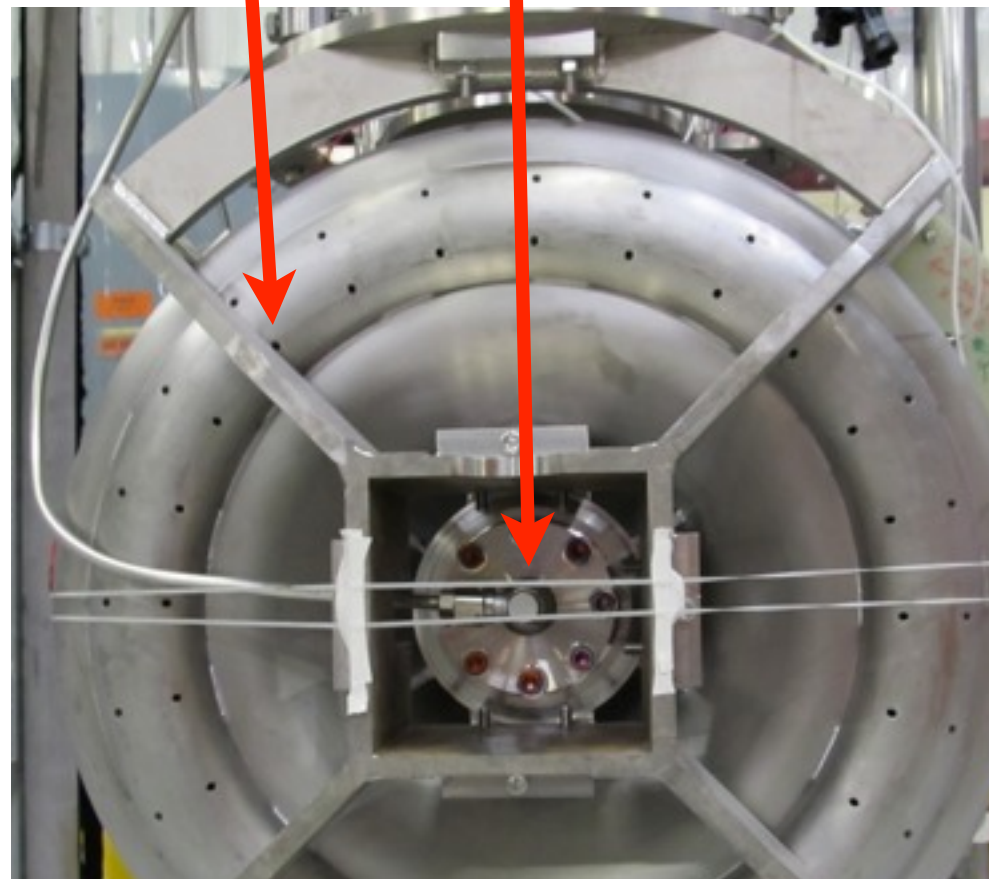
Pictures courtesy of Dmitri Sergatskov

Installation of the 2nd sound system



Cavity mounted on top plate

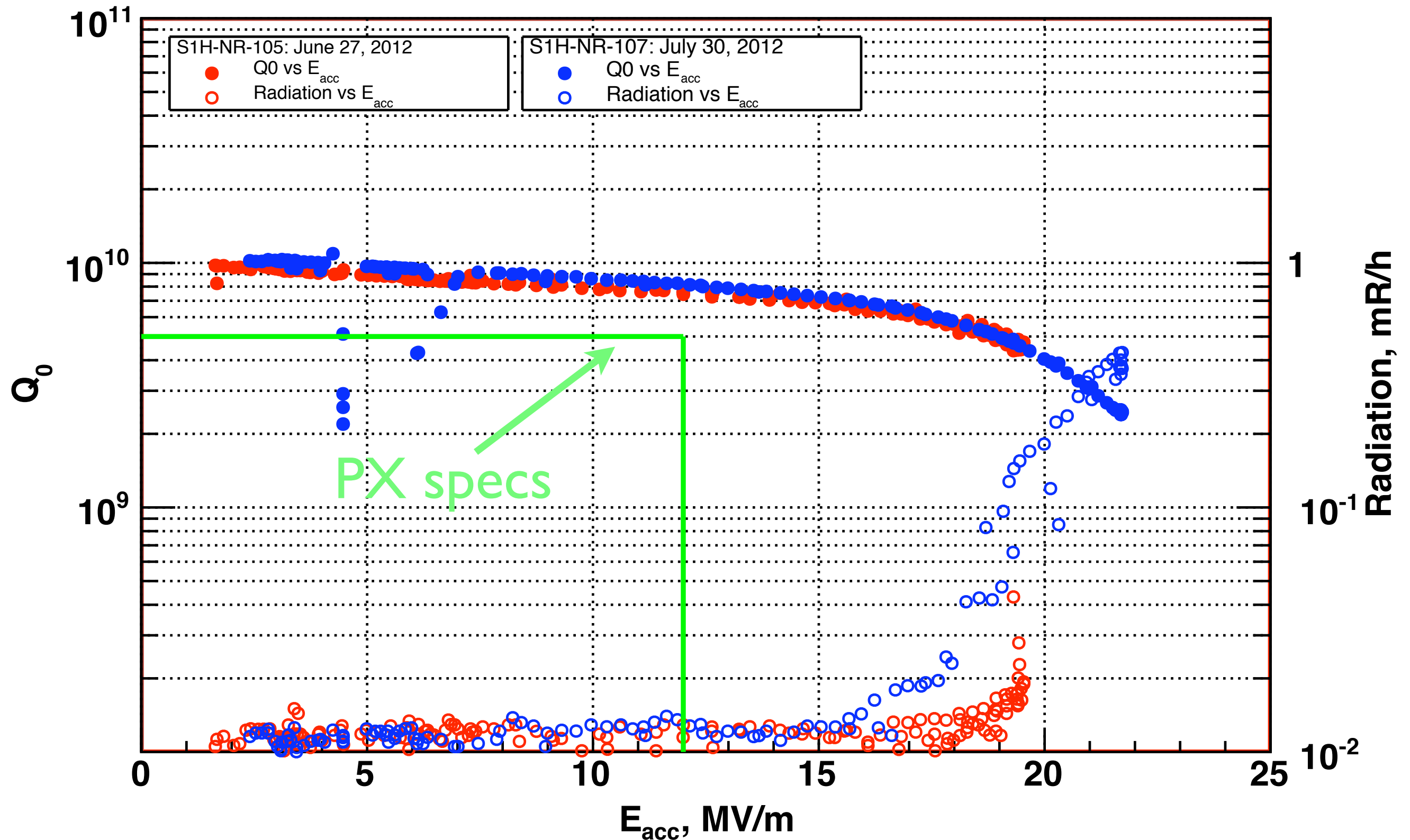
Cage and P_{inc} coupler



Summary of Cold Tests

SIH-NR-105 and SIH-NR-107

$$E_{\text{acc}} = V_{\text{gain}} / \beta \lambda$$



VTS Schedule (10/10/2012)

Camille, Allan, Anna, Yuri

• How SSR I tests fit into VTS schedule

	Tuesday	Friday	Comments	325 MHz SSR1
June 26,28	S1-NR-105	S1-NR-105	optimistic for MP	650 MHz 1-cell
July 3,6	1-cell(s)-TP2	1-cell(s)-TP2		1300 MHz 1-cell(s)
July 10,13	1-cell(s)-TP2	1-cell(s)-TP2		1300 MHz 9-cell
July 17,20	1-cell(s)-TP3	1-cell(s)-TP3	JLab workshops	2800 MHz deflecting
July 24,27	TB9ACC014 - AES EP - TP2	S1-NR-107 - TP3		
July 30, Aug 3	S1-NR-107 - TP3	1-cell(s)-TP2 (ACC005, 1B5,CAT003)		
Aug 7, 10	TE1DE20,TE1AES016 - TP2	TE1ACC005-TP3 (student)		
Aug 14, 17	TE1PAV005,TE1ACC001,TE1AES008 - TP2	TB9ACC014 - AES EP - TP3	no AM 14th	
Aug 21,24	TE1AES016 - TP3 (T-map) - cold leak	1DE20 - (Tmap)-TP3		
Aug 28,31	floor painting	floor painting	two to three test days lost	
Sep 5,6 (NB!)	TE1AES016 - TP3 (T-map)			
Sep 11,14	TE1AES012,TE1AES005, TE1AES003	TB9ACC014 - AES EP after HF rinse - TP2		
Sep 18,21	TE1ACC001, TE1AES008	TE1NR005, 1DE20, TE1AES016		
Sep 25,28	TE1NR005, 1DE20, TE1AES016	PIPPS03	Retest on Tues. to cycle to 10K and back down to purge flux lines a	
Oct 2,5	TB9NR004 - IB4 HPR - TP2	TE1PAV001, TE1CAT004	Yuriy away	
Oct 9,12	TE1AES005, TE1AES003	shutdown	ASC conference	
Oct 16,19	shutdown	shutdown	20th power outage--no SSR bake, All top plates	
Oct 23, 26	JLABindium1?, TE1PAV006	TE1PIPSS03, TE1AES013	may have to use dewars at IB1--Others: TE1AES010, Charlie option	
Oct 30, Nov 2	S1-NR-108	S1-NR-108	no Anna/AlexR---Yuri suggests to run SSR here	
Nov 6, 9			TTC; no Anna/AlexR	
Nov 13,16	S1-NR-109	S1-NR-109		
Nov 20	TE1AES012--Tmap	thanksgiving	Thanksgiving	
Nov 27,30	650 MHz	650 MHz	TE1AES013(IB4), TE1PAV006	
Dec 4,7	S1-NR-110	S1-NR-110	TE1AES012 - TP3	
Dec 11,14			Charlie cavities	
Dec 18,21	TB9NR002 - tumbled	TB9ACC014 - variable coupler	TE1JL001,TE1JL002	
			TE1NR004--Tmap laser remelt--TP3	
Jan 4	holiday	holiday	thin film 1 cells x 2r	
Jan 8,11	holiday		PIPPS03 (cavity vendor/STFC)	
	IHEP-LL-LG	IHEP-LL-LG	TE1PAV006 - for AES 1/4-wave	

All delivered SSR I cavities will be vertically tested before end of the year

- Defects (blow-through) were found during EBW at NR
 - ▶ Attributed to “unexplained” surges in EBW-machine parameters (I,V) during welding
 - ▶ 4 SSRI cavities (I I I, I I 2, I I 3 & I I 4) were put on hold before final welding (end plates to side wall)
 - ▶ Tests to optimize EBW-machine performance were done at NR
 - results are available for review
 - ▶ Expect to resume final welding early November (?)
- SHI-NR-I06 has leak due to defect in weld of stiffening rib to end plate
 - ▶ Has been sent to NR for repair
 - ▶ Expect delivery early next year (?)

Summary and Plans

- SIH-NR-105, SIH-NR-107 passed PX requirements
 - ▶ processing procedure established for SSR I cavities
- SIH-NR-108 is in preparation for cold test in the week of October 30
- SIH-NR-109 & 110 will be tested in November-December
 - ▶ will use new 120C oven in MP9 for 120C bake
- Expect delivery of SIH-NR-111, 112, 113 & 114 before end of the year
- Will put cavities in processing-testing pipeline ASAP